

IN THE CLAIMS:

Please cancel claims 4-6, 24, 25, and 31-39 from the application, without prejudice or disclaimer as to the subject matter of the canceled claims.

Applicants have attached to this Amendment a document entitled "Amended Claims." Please replace present claims 1-3, 7-23, and 26-30 with amended claims 1-3, 7-23, and 26-30, as shown in this document. Please also add new claim 40-48, as shown in this document. The changes made to amended claims 1-3, 7-23, and 26-30 are shown in the attached document entitled "Marked-up Copy of the Amended Claims."

REMARKS

Applicants respectfully request reconsideration of this application, as amended herein, and reconsideration of the Office Action dated May 23, 2001.

Claims 1-3, 7-23, 26-30 and 40-48 are presently pending in the application. Claims 4-6, 24, 25, and 31-39 have been canceled from the application, without prejudice or disclaimer as to the subject matter of the canceled claims. Method claims 40-48 are newly presented herein.

Applicants confirm the election with traverse of the claims of Group I, being claims 1-23 and 26-30. The non-elected claims have been canceled from the application. New method claims 40-48 are presented herein, which claims depend from the elected subject matter. If the newly-presented method claims are withdrawn as non-elected subject matter, Applicants respectfully request that these claims be rejoined in the application when the elected claims are allowed.

The claims have been amended to better describe specifically describe the invention, and thus place the claims in even better form for examination. Independent claims 1 and 7, for example, better describe the intermittent coating supply means. The claims now refer to a "coating," rather than the earlier-recited "paint." Support for the use of the word "coating" can be found throughout the specification referring to paint "coatings." The word "paste" also is used to describe the material as a coating. Applicants respectfully submit that the claims of the application, as amended, contain no new matter, and respectfully request entry and favorable consideration of the changes.

Newly-presented claims 40-48 are presented in method form, and depend from apparatus claim 1. Support for these method claims can be found in the description of the "first embodiment," beginning at page 11, line 14, throughout the description of the apparatus, and in the original claims. Applicants respectfully submit that the newly-presented claims contain no new matter. Entry and favorable consideration of these new claims is therefore respectfully requested.

* * *

The specification has been amended to describe the Japanese patent document discussed on page 1 as being Japanese Patent *Application* No. 7-311997 (corresponding to JP Laid-open H8-229481), rather than being a "*Laid-open* Application. An Information Disclosure Statement is being filed with this Amendment, with the necessary fee, in order to make of record the JP Laid-open H8-229481, corresponding to the cited Japanese Patent Application No. 7-311997. Applicants respectfully request entry of the changes made to the specification.

* * *

Claims 1, 4, 7 and 26-27 were rejected in the Office Action under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over, Claassen. Applicants respectfully traverse this rejection and request reconsideration.

Similarly, claims 2, 3, 5, 6, 8-23 and 28-30 were rejected in the Office Action under 35 U.S.C. § 103(a) as being unpatentable over Claasen. Applicants respectfully traverse this rejection also, and request reconsideration.

It was asserted in the Office Action that Claassen teaches a coating apparatus including a nozzle for applying coating to a base material, and intermittent means which intermittently feeds and stops coating to the nozzle, as well as discharge and stopping of coating to a return side, the intermittent means being controlled by control means that opens and closes feed and return valves 9, 25. However, Applicants respectfully note that claims 1 and 7 have been amended to describe the intermittent means in a way such that Claassen neither discloses nor fairly suggests the invention as presently claimed.

Amended claims 1 and 7 describe an intermittent coating apparatus, such as that depicted in exemplary Figure 2, which includes a nozzle and an intermittent coating supply means that intermittently feeds the coating to the nozzle, stops the feeding of the coating to the nozzle, and discharges remaining coating to a return side. The intermittent coating supply means of the claims, as amended, includes a coating tank, a flow path that supplies coating from the coating tank and the recited two, two-way valves. The flow path includes a feeding side in communication with the nozzle, a return side in communication with the coating tank, and a segment that connects the feeding side and the return side. The flow path described, taken with the two two-way valves of the intermittent coating supply means, allows precise

control of the coating process, especially when starting and stopping an intermittent coating of a base material.

The two two-way valves include: a feeding side two-way valve, positioned between the flow path segment and the feeding side of the flow path, that intermittently feeds and stops the feed of the coating to the nozzle; and a return side two-way valve, positioned between the flow path segment and the return side of the flow path, that intermittently discharges remaining coating to the tank through the return side of the flow path, and stops discharge of the remaining coating to the tank through the return side of the flow path. This configuration, for example according to claim 1, allows the intermittent coating supply means to prevent discharge of the coating to the return side at the time of starting of feeding of the coating, leading to unexpectedly desirable results in the coating process. Applicants respectfully submit that Claassen neither teaches nor fairly suggests the intermittent means of the claimed invention, which includes two two-way valves disposed in a flow path so as to provide precise control over the starting and stopping of the coating flow in the flow path.

Applicants respectfully note that, in contrast with the claimed invention which uses two two-way valves, Claassen teaches the use of one two-way valve with what is, in effect, a three-way valve, and teaches a different configuration of the two-way valves with respect to the flow path through which the adhesive is provided. Claassen teaches, for example at column 3, lines 31-37, the use of a main needle valve 9 that extends vertically, and that, in its lowered position, closes a valve seat 6 to prevent the flow of hot-melt adhesive to the nozzle. See the single Figure of Claassen. This main needle valve is seen to be analogous to a two-way valve; when in the lowered position, the adhesive flow is prevented, when in the raised position, the adhesive flow is permitted.

The hot-melt adhesive is provided according to Claassen through a horizontal passage 10 from a connecting piece 20 through which the hot-melt adhesive is provided via an insulated supply hose. See column 3, lines 57-63 and the Figure. A second needle valve 25 is disposed over the horizontal supply bore 10, which is taught to be structurally similar to the main needle valve. See column 4, lines 3-22 and the Figure. However, this second needle valve 25 is analogous to a three-way valve, because the valve allows the adhesive to flow from the connecting piece through the horizontal passage 10 to the main needle valve 9, and is used as well to prevent or permit the return flow of adhesive, away from the nozzle, through the vertical bore 26 to the connecting piece 28, through which the adhesive is returned. Thus, Claassen teaches both that the adhesive is fed *through* the three-way valve, and that the adhesive is returned *through* the three-way valve. This configuration is seen to differ significantly from the claimed invention, in which the flow path provides coating at a point between the two two-way valves, so that the coating can travel through either the feeding side two-way valve, or the return side two-way valve, in the first instance. Applicants respectfully submit that the rejection with respect to claims 1 and 7 is overcome, as well with respect to those claims which depend from them. Similarly, the rejection with respect to claim 26, drafted along the lines of claims 1 and 7 but including control means, is likewise seen to be overcome, as well the rejection of claims depending from it. Applicants therefore respectfully request that the rejections be withdrawn, and the claims allowed.

Claim 11, the other independent claim of the application, is drawn to an intermittent coating apparatus which includes intermittent coating supply means, which intermittently feeds a coating to a nozzle; coating returning means, which intermittently draws the coating out of the nozzle, and returns the coating to the nozzle; and control means, for controlling an

operation time A to draw the coating out of the nozzle, and an operation time B to return the coating to the nozzle, so that the operation time A is less than the operation time B. Applicants respectfully submit that Claassen likewise neither discloses nor fairly suggests such an apparatus for controlling the recited operation times. The structure of Claassen simply differs significantly from that according to the claimed invention. Applicants therefore respectfully submit that the rejection of claim 11 and those claims which depend from it is overcome, and respectfully request that the rejection be withdrawn.

* * *

Applicants respectfully submit that the outstanding rejections are overcome, and that the application is in condition for allowance. Allowance at the Examiner's earliest convenience is respectfully requested.

If any fees are due in connection with the filing of this Amendment or the papers that accompany it, such as fees under 37 C.F.R. §§ 1.16 or 1.17, please charge the fees to our Deposit Account No. 02-4300. If an extension of time under 37 C.F.R. § 1.136 is necessary that is not accounted for in the papers filed herewith, such an extension is requested. The extension fee also should be charged to Deposit Account No. 02-4300.

Respectfully submitted,

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Marked-up Copy of the Amended Paragraphs:

Please amend the second and third paragraphs on page 1, as follows:

“Japanese Patent Application [Laid-Open] No. 7-311997 (corresponding to JP Laid-open H8-229481) discloses a coating apparatus for intermittently coating a paint to a base material which is running continuously. This apparatus adopts such a method that winds a base material in a field of batteries around a back roll and disposes a nozzle at a location opposed to the base material, and repeats feeding of the paint to the nozzle and stop of the feeding, thereby forming portions not coated with the paint, that is, lead welding portions on the base material.

However, when a paste for batteries is intermittently coated as a paint to a collector material by the coating apparatus disclosed by Japanese Patent Application [Laid-Open] No. 7-311997, an active substance layer is coated approximately 20 mm from the coating start terminal of the active substance layer in a running direction of the collector material as shown in FIG. 7, whereby the active substance layer of a thickly coated portion may be peeled off and drop down at a subsequent rolling step. It is considered that this defect is caused by the fact that because a feeding path and a return path are momentarily set to simultaneously opened status at the time of switching the feeding path and the return path at the intermittent time by moving a head used as intermittent means, thereby the paint excessively flows from the return side into the feeding said, or the nozzle. Accordingly, the layer is coated thicker for an amount of the paint which excessively flows into the nozzle at a coating start time.”

Marked-up Copy of the Amended Claims:

1. (Amended) An intermittent coating apparatus, comprising:

a nozzle, which applies a coating [paint] to a base material; and

intermittent coating supply means, which intermittently feeds the coating

[repeats feeding and stopping of said paint] to the [said] nozzle, stops the feeding of the
coating to the nozzle, and [as well as] discharges [and stopping of said paint] remaining
coating to a return side, the intermittent coating supply means including:

a coating tank,

a flow path supplying coating from the coating tank, the flow path
including a feeding side in communication with the nozzle, a return side in
communication with the coating tank, and a segment that connects the feeding
side and the return side,

a feeding side two-way valve, positioned between the flow path segment
and the feeding side of the flow path, that intermittently feeds and stops the feed
of the coating to the nozzle, and

a return side two-way valve, positioned between the flow path segment
and the return side of the flow path, that intermittently discharges remaining
coating to the tank through the return side of the flow path, and stops discharge
of the remaining coating to the tank through the return side of the flow path,

wherein the [said] intermittent coating supply means prevents [stops the]
discharge of the coating [paint] to the [said] return side [after starting the feeding of the
paint to said nozzle, at least] at the time of starting feeding of the coating.

2. (Amended) The intermittent coating apparatus according to claim 1, wherein [a timing to] the time of starting the feeding of the paint to the [said] nozzle is earlier than the time of [a timing to] stopping the discharge of the paint to the [said] return side within a range of not less [shorter] than 5 msec and not more [longer] than 500 msec.

3. (Amended) The intermittent coating apparatus according to claim 1, wherein the time of [a timing to] starting the feeding of the paint to the [said] nozzle is earlier than the time of [a timing to] stopping the discharge of the paint to the [said] return side within a range of not less [shorter] than 5 msec and not more [longer] than 100 msec.

7. (Amended) An intermittent coating apparatus, comprising:

a nozzle, which applies a coating [paint] to a base material; and
intermittent coating supply means, which intermittently feeds the coating [repeats feeding and stopping of said paint] to the [said] nozzle, stops the feeding of the coating to the nozzle, and [as well as] discharges remaining coating [and stopping of said paint] to a return side, the intermittent coating supply means including:

a coating tank,

a flow path supplying coating from the coating tank, the flow path including a feeding side in communication with the nozzle, a return side in communication with the coating tank, and a segment that connects the feeding side and the return side,

a feeding side two-way valve, positioned between the flow path segment and the feeding side of the flow path, that intermittently feeds and stops the feed

of the coating to the nozzle, and

a return side two-way valve, positioned between the flow path segment and the return side of the flow path, that intermittently discharges remaining coating to the tank through the return side of the flow path, and stops discharge of the remaining coating to the tank through the return side of the flow path,

wherein the [said] intermittent coating supply means starts the discharge of the coating [paint] to the [said] return side [after stopping the feeding of the paint to said nozzle, at least] at the time of ending the feeding of the coating.

8. (Amended) The intermittent coating apparatus according to claim 7, wherein the time of [a timing to] stopping the feeding of the coating [paint] to the [said] nozzle is earlier than the time of [a timing to] starting the discharge of the coating [paint] to the [said] return side within a range of not less [shorter] than 0 msec and not more [longer] than 100 msec.

9. (Amended) The intermittent coating apparatus according to claim 1, further comprising,

coating [paint] returning means which intermittently [repeats operations to suck said paint] draws the coating out of the [said] nozzle and [to] returns the coating to [paint into] the nozzle,

wherein the coating [said paint] returning means returns the coating to [paint into] the nozzle at the time of [a timing to] starting the feeding of the coating [paint] to the [said] nozzle at the coating start time, and draws the coating [sucks the paint] out of

the nozzle at the time [a timing] of [the] stopping [of] the feeding of the coating to the [paint to said] nozzle.

10. (Amended) The intermittent coating apparatus according to claim 7, further comprising:

coating [paint] returning means which intermittently draws the coating [repeats operations to suck said paint] out of the [said] nozzle and [to] returns the coating to [paint into] the nozzle,

wherein the coating [said paint] returning means returns the coating to [paint into] the nozzle at the time of [a timing to] starting the feeding of the coating to the [paint to said] nozzle at the coating start time, and draws [sucks] the coating [paint] out of the nozzle at the time [a timing] of [the] stopping [of] the feeding of the coating to the [paint to said] nozzle.

11. (Amended) An intermittent coating apparatus comprising:

intermittent coating supply means which intermittently feeds a coating [paint] to a nozzle; [and]

coating [paint] returning means which intermittently draws the coating [repeats suction and return of said paint] out of the nozzle, and returns the coating to the [and into said] nozzle[,]; and

control means for controlling [wherein the relation between] an operation time A to draw the coating [suck said paint] out of the [said] nozzle, and an operation time B

to return the coating to the nozzle, so that the operation time A is less than [and an] the
operation time B [to return said paint into said nozzle is in a relation of A < B].

12. (Amended) The intermittent coating apparatus according to claim 9, wherein the
coating is drawn [paint is sucked] out of said nozzle in an amount of not less [smaller] than
0.01 cc and not more [larger] than 10 cc.

13. (Amended) The intermittent coating apparatus according to claim 10, wherein the
coating is drawn [paint is sucked] out of said nozzle in an amount of not less [smaller] than
0.01 cc and not more [larger] than 10 cc.

14. (Amended) The intermittent coating apparatus according to claim 11, wherein the
coating is drawn [paint is sucked] out of said nozzle in an amount of not less [smaller] than
0.01 cc and not more [larger] than 10 cc.

15. (Amended) The intermittent coating apparatus according to claim 9, wherein the
coating [paint] is returned [into said] to the nozzle at a flow rate of not less [lower] than 1
cc/msec.

16. (Amended) The intermittent coating apparatus according to claim 10, wherein the
coating [paint] is returned to the [into said] nozzle at a flow rate of not less [lower] than 1
cc/msec.

17. (Amended) The intermittent coating apparatus according to claim 11, wherein the coating [paint] is returned to the [into said] nozzle at a flow rate of not less [lower] than 1 cc/msec.

18. (Amended) The intermittent coating apparatus according to claim 12, wherein the coating [paint] is returned to the [into said] nozzle at a flow rate of not less [lower] than 1 cc/msec.

19. (Amended) The intermittent coating apparatus according to claim 13, wherein the coating [paint] is returned to the [into said] nozzle at a flow rate of not less [lower] than 1 cc/msec.

20. (Amended) The intermittent coating apparatus according to claim 14, wherein the coating [paint] is returned to the [into said] nozzle at a flow rate of not less [lower] than 1 cc/msec.

21. (Amended) The intermittent coating apparatus according to claim 9 [1], wherein the [operations of said paint] coating returning means [are carried out by utilizing] uses a piezoelectric element.

22. (Amended) The intermittent coating apparatus according to claim 10 [7], wherein the [operations of said paint] coating returning means uses [are carried out by utilizing] a piezoelectric element.

23. (Amended) The intermittent coating apparatus according to claim 11, wherein the [operations of said paint] coating returning means uses [are carried out by utilizing] a piezoelectric element.

26. (Amended) An intermittent coating apparatus, comprising:

a nozzle, which applies a coating [paint] to a base material; and intermittent coating supply means, which intermittently feeds the coating [repeats feeding and stopping of said paint] to the [said] nozzle, stops the feeding of the coating to the nozzle, and [as well as] discharges remaining coating [and stopping of said paint] to a return side, the [wherein said] intermittent coating supply means [comprises] including:

a coating tank,

a flow path supplying coating from the coating tank, the flow path including a feeding side in communication with the nozzle, a return side in communication with the coating tank, and a segment that connects the feeding side and the return side,

a feeding side two-way valve, positioned between the flow path segment and the feeding side of the flow path, that intermittently feeds and stops the feed [which repeats the feeding] of the coating [said paint] to the [said] nozzle [and stop of the feeding],

a return side two-way valve, positioned between the flow path segment and the return side of the flow path, that intermittently [which repeats the] discharges remaining coating to the tank through [of said paint to] the return

side of the flow path, and stops discharge of the remaining coating to the tank
through the return side of the flow path,

[a flow path through which said paint flows,] and

control means which [can] independently controls [the] operation[s] of
the [said] feeding side two-way valve and the [said] return side two-way valve.

27. (Amended) The intermittent coating apparatus according to claim 26, wherein at least the [said] return side two-way valve is configured [with cutting off or opening said] to open and close the flow path by operating a piston, and wherein the [said] piston is moved to close the [said] flow path in a direction which is the same as that of a flow of the coating to the [said paint to said] return side.

28. (Amended) The intermittent coating apparatus according to claim 26, wherein the time of [a timing to] switching the [said] feeding side two-way valve is earlier than the time of [a timing to] switching the [said] return side two-way valve, at the time of starting the coating [least a coating start time], within a range of not less [shorter] than 5 msec and not more [longer] than 500 msec.

29. (Amended) The intermittent coating apparatus according to claim 27, wherein the time of [a timing to] switching the [said] feeding side two-way valve is earlier than the time of [a timing to] switching the [said] return side two-way valve, at the time of starting the coating, [least a coating start time] within a range of not less [shorter] than 5 msec and not more [longer] than 500 msec.

30. (Amended) The intermittent coating apparatus according to claim 26, wherein the coating discharged to the tank [paint sucked out of said nozzle] is in an amount of not less [smaller] than 0.01 cc and not more [larger] than 10 cc.